Preface

This report presents international energy projections through 2030, prepared by the Energy Information Administration, including outlooks for major energy fuels and associated carbon dioxide emissions.

The *International Energy Outlook 2006* (*IEO2006*) presents an assessment by the Energy Information Administration (EIA) of the outlook for international energy markets through 2030. U.S. projections appearing in *IEO2006* are consistent with those published in EIA's *Annual Energy Outlook 2006* (*AEO2006*), which was prepared using the National Energy Modeling System (NEMS). *IEO2006* is provided as a service to energy managers and analysts, both in government and in the private sector. The projections are used by international agencies, Federal and State governments, trade associations, and other planners and decisionmakers. They are published pursuant to the Department of Energy Organization Act of 1977 (Public Law 95-91), Section 205(c).

IEO2006 focuses exclusively on marketed energy. Nonmarketed energy sources, which continue to play an important role in some developing countries, are not included in the estimates. The *IEO2006* projections are based on U.S. and foreign government laws in effect on January 1, 2006. The potential impacts of pending or proposed legislation, regulations, and standards are not reflected in the projections, nor are the impacts of legislation where the mechanisms for implementing the legislation have not yet been announced. For example, the *IEO2006* reference case does not include the potential impacts of the Kyoto Protocol (which entered into force on February 16, 2005), because the treaty does not indicate the methods by which signatories will implement the Protocol. The Kyoto Protocol also does not address signatory obligations beyond 2012, making it impossible in the context of a reference case projection for EIA to assess the impacts of the Protocol through 2030, the end of the *IEO2006* projection period.

Projections in *IEO2006* are displayed according to two basic regions or country groupings: members of the Organization for Economic Cooperation and Development (OECD) and nonmembers (non-OECD) (see Appendix J for complete regional definitions). The regionalization has changed since last year's report. The OECD region includes three basic subgroups: North America (United States, Canada, and Mexico); OECD Europe; and OECD Asia (Japan, South Korea, and Australia/New Zealand). The non-OECD region is divided into five separate regional subgroups: non-OECD Europe and Eurasia, non-OECD Asia, Africa, Middle East, and Central and South America. Russia is included in non-OECD Europe and Eurasia; China and India are included in non-OECD Asia; and Brazil is included in Central and South America.

The report begins with a review of world trends in energy demand and the major macroeconomic assumptions used in deriving the *IEO2006* projections. The time frame for historical data begins with 1980 and extends to 2003, providing a 23-year historical view of energy demand. The projections extend to 2030. High economic growth and low economic growth cases were developed to depict a set of alternative growth paths for the energy forecast. The two cases consider higher and lower growth paths for regional gross domestic product (GDP) than assumed in the reference case. The resulting projections—and the uncertainty associated with international energy projections in general—are discussed in Chapter 1, "World Energy and Economic Outlook."

Worldwide and regional projections of end-use energy consumption in the residential, commercial, industrial, and transportation sectors are presented in Chapter 2. Projections for energy consumption by fuel—petroleum, natural gas, and coal—are presented in Chapters 3, 4, and 5, along with reviews of the current status of each fuel on a worldwide basis. Chapter 6 discusses the projections for world electricity markets—including nuclear power, hydropower, and other commercial renewable energy resources—and presents forecasts of world installed generating capacity. Finally, Chapter 7 discusses the outlook for global carbon dioxide emissions. With the entry into force of the Kyoto Protocol on February 16, 2005, this year's outlook includes a Kyoto Protocol scenario, which is also presented in Chapter 7.

Appendix A contains summary tables of the *IEO2006* reference case projections for world energy consumption, GDP, energy consumption by fuel, carbon dioxide emissions, and regional population growth. The reference case projections of total foreign energy consumption and consumption of oil, natural gas, coal, and renewable energy were prepared using EIA's System for the Analysis of Global Energy Markets (SAGE), as were projections of net electricity consumption, energy consumed by fuel and region and by end-use sector, and carbon dioxide emissions. In addition, the NEMS Coal Export Submodule was used to derive flows in international coal trade, presented in Chapter 5.

Summary tables of projections for the high and low economic growth cases are provided in Appendixes B and C, respectively. Appendix D contains reference case projections of delivered energy consumption by end-use sector and region. Appendix E contains summary tables of projections for world oil production capacity and oil production in the reference case and the high and low world oil price cases. The projections in Appendix E were derived from the International Energy Module of NEMS. Appendix F contains summary tables of reference case projections for installed electric power capacity by fuel, as well as regional electricity generation by fuel. Appendix G provides a summary of assumptions underlying the *IEO2006* Kyoto Protocol case. Appendix H includes a set of comparisons of alternative forecasts with the *IEO2006* projections, as well as comparisons of historical *IEO* forecasts with actual historical data. Comparisons of the *IEO2006* and *IEO2005* forecasts are also presented in Appendix H. Appendix I describes the SAGE model, and Appendix J defines the regional designations included in the report.

Objectives of the *IEO2006* Projections

The projections in *IEO2006* are not statements of what will happen, but what might happen given the specific assumptions and methodologies used. These projections provide an objective, policy-neutral reference case that can be used to analyze international energy markets. As a policy-neutral data and analysis organization, EIA does not propose, advocate, or speculate on future legislative and regulatory changes. The projections are based on U.S. and foreign government laws effective as of January 1, 2006. Assuming fixed laws, even knowing that changes will occur, will naturally result in projections that differ from the final data.

Models are abstractions of energy production and consumption activities, regulatory activities, and producer and consumer behavior. The forecasts are highly dependent on the data, analytical methodologies, model structures, and specific assumptions used in their development. Trends depicted in the analysis are indicative of tendencies in the real world rather than representations of specific real-world outcomes. Many events that shape energy markets are random and cannot be anticipated, and the content and timing of policy developments, as well as assumptions concerning future technology characteristics, demographics, and resource availability, are inherently uncertain.